IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Introductory Portion

Be it known that I, PAUL L. JERUSS, a citizen of the United States and a resident of Stockton, County of San Joaquin, State of California, have invented a new and useful

WALK RAMP

of which the following is a specification.

Background Of The Invention

1. Field of the Invention

The invention relates generally to portable ramps used to load and unload goods from a truck, either to the ground or to a loading dock. More particularly, the invention pertains to ramps and components thereof, in which a plurality of modular, interlocking tread plates spans a pair of side rails, to form a walking surface of unusual strength mechanical integrity.

2. Description of the Prior Art

The prior art teaches a variety of different approaches for walking ramp construction. For example, in U.S. Patent No. 3,328,818, a reinforced walk ramp is shown, which uses three longitudinal beams, side pieces, and a sheet of reinforced plywood. The assembly is integrally secured by means of a resin impregnated fiberglass mat structure. U.S. Patent No. 5,325,558, issued to Labreche, discloses a wheelchair ramp apparatus, in which hingeably connected U-shaped tracks

accommodate supportive mesh pieces. Two sets of the tracks are further connected to each other by means of a connecting link. And, in U.S. Patent No. 5,815,870, granted to Deutch et al., a reversible ramp utilizing a plurality of die-cast grates, sandwiched between a pair of extruded magnesium alloy side members, is shown. In this construction, tie rods are connected to and extend between the side members, so that adjacent grates are separated and supported by an intermediate tie rod. This ramp is reversible by virtue of gripping nodules on the upper and lower side of each grate.

The need exists, however, for a walk ramp which is not only lightweight, but sufficiently durable to withstand the rigors of daily commercial use.

The need further exists for a walk ramp which includes modular tread plates which can be easily replaced, in the event of damage or breakage.

The need also exists for a walk ramp which is modular in construction, so that ramps of various lengths can easily be manufactured employing the same construction techniques.

The need also exists for a walk ramp which has a surface adapted for accommodating rolling apparatus, such as a dolly, and which also provides a walking surface with gripping characteristics for safe walking.

These and other objects will be described below in the drawings and the detailed description of the preferred embodiment to follow.

Summary Of The Invention

The present invention comprises a lightweight, portable walk ramp, for use in spanning two locations, of identical or different elevations. Generally, such a walk ramp will be used

for manually loading and unloading goods from a truck or a trailer. The ramp has sufficient strength, and durability, and presents surface characteristics to allow a driver, through the use of a dolly, or other rolling carrier, to transport the goods onto or off of the truck or trailer.

To that end, the ramp comprises a pair of elongated side rails, preferably made from extruded aluminum. The side rails include opposing, inwardly facing, open rail channels, arranged in substantially parallel relation. The rail channels are U-shaped in cross-section, having a floor portion and upper and lower walls.

The present invention also includes a plurality of interlocking modular tread plates, which form the walking surface of the ramp. Each tread plate has a first connecting edge provided with a male flange, and a second connecting edge provided with a female recess. The connecting edges are parallel to and opposing each other, and they are substantially identical in length. The flanges and recesses within the connecting edges are sized and configured to interlock in sliding relation. Thus, in initially assembling the ramp, the male flange of a first tread plate slidably engages a female tread plate of a second tread plate. This process continues until the desired length for the ramp surface, is achieved.

Each tread plate further includes opposing outer edges, extending between the first and second connecting edges. The outer edges are typically shorter than the connecting edges, forming a tread plate which is generally rectangular in plan. The outer edges of the assembled tread plates are inserted within the U-shaped rail channels.

Each tread plate also features a plurality of upstanding ribs and a reinforcement tube, arranged in parallel, spaced relation across the tread plate. Both the ribs and the reinforcement tube extend between the outer edges of the plate. Bolts pass inwardly through the sidewalls of the rails,

and threadably engage respective open ends of the reinforcement tube. Other bolts which are provided, pass through the upper and lower walls of the rail channels, securing the outer edges of the tread plate therebetween.

A plurality of elongated slots is provided in tread channels defined by the space between the ribs. This effectively lowers the overall weight of the ramp, without significantly diminishing its overall strength. In addition, larger gripping apertures, sized and configured to pass a worker's hand, are provided in the tread plate. By utilizing these gripping apertures, a worker may conveniently grasp the walk ramp, for installation and removal of the ramp at a work site.

An apron is provided at the upper end of the walk ramp, and a skid plate is provided at the ramp's lower end. The apron provides a surface transition with the floor of the truck or van. The skid plate provides a surface transition with the ground or a loading dock.

Brief Description Of The Drawings

Figure 1 is a left front perspective view of the walking ramp of the present invention, the intermediate portion of the ramp being shown in broken line to represent an indeterminate number of tread plates and associated lengths of side rails, extending between upper and lower lengths of the ramp;

Figure 2 is a right front perspective of a short version of the present walking ramp, including only two tread plates, illustrative of the basic features of the ramp;

Figure 3 is an exploded perspective of the ramp of Figure 2, showing the two tread plates, the opposing side rails, the upper apron, and the lower skid plate;

Figure 4 is an inset detail view, showing a connection bolt, a fragment of the side rail,

and a fragment of the tread plate including the reinforcement tube and the male flange;

Figure 5 is an inset detail view, showing fragmentary mating portions of two tread plates;

Figure 6 is a top plan view of the walking ramp of Figure 2;

Figure 7 is a side elevational view of the walking ramp of Figure 2;

Figure 8 is a fragmentary, cross-sectional view taken on the line 8-8, in Figure 6;

Figure 9 is a fragmentary, cross-sectional view taken on the line 9-9, in Figure 6;

Figure 10 is a fragmentary, cross-sectional view taken on the line 10-10, in Figure 6;

Figure 11 is a fragmentary, cross-sectional view taken on the line 11-11, in Figure 6; and,

Figure 12 is a fragmentary, cross-sectional view taken on the line 12-12, in Figure 7.

Detailed Description Of The Preferred Embodiment

Turning now to the drawings, and in particular to Figure 1, the walk ramp 11 of the present invention comprises one or more tread plates 12. Because the tread plates are modular and of identical characteristics, a plurality of tread plates may be assembled to form a walk ramp of any desired length, as represented by the two differing ramps 11 shown in Figures 1 and 2. It is preferred that tread plates 12 are formed from extruded aluminum, to maintain a desirable balance between weight and strength.

Each tread plate 12 has opposing side edges 13 and 14. A first connecting edge 16 and a second connecting edge 17, extend between side edges 13 and 14. The first connecting edge 16 includes male connector means 18 comprised of a flange 19. In the disclosed preferred

embodiment, flange 19 is generally v-shaped in cross-section, including a pair diverging wing portions. However, the particular configuration is not critical, with obvious equivalents including "T", "L", and knob-shaped flanges.

The second connecting edge 17 is provided with female connector means 21. As shown in Figure 8, female connector means 21 includes a female connector head 22 with a recess 23 on one side thereof. So as to accommodate the configuration of flange 19, recess 23 includes a base 24, an open top portion 26, and converging walls 27 extending between the base 24 and the open top portion 26. It should also be noted that fillets 28, comprising thickened or reinforced regions having a radius, are provided on the other side of the female connector head 22 to reinforce the connector assembly. As will be pointed out further herein, other fillets are strategically located throughout the tread plate 12, to ensure both the strength and durability of the ramp 11.

Making particular reference to Figures 3 and 5, the male connector means 16 of one tread plate 12 is sized and configured slidably to engage a female connector means 21 of another tread plate 12. In this manner, two or more tread plates 12 are interlocked to each other to provide additional structural integrity for the ramp. Additionally, owing to the modular characteristics of the tread plates 12, if an individual tread plate failed, a substitute tread plate can easily be installed in interlocking fashion with the other tread plates.

To provide additional rigidity to tread plates 12, a plurality of protruding ribs 29 is provided. Ribs 29 extend substantially between opposing side edges 13 and 14, and are arranged in parallel, spaced relation across said plate to define tread channels 31 therebetween. The ribs 29 preferably protrude both from the upper side and from the lower side of the plates 12. A plurality of transverse notches 32 may be provided in an outer edge of the ribs extending from the upper side

of the plates 12. Notches 32 provide additional gripping friction for shoes and wheels passing over the exposed upper side of the plates 12.

Tread plates 12 are further provided with at least one reinforcement means 33, integrally formed with the plate itself. This integral formation of the reinforcement means with the plate is effected in a straightforward manner, when the tread plates are manufactured using an extrusion process. Each reinforcement means 33 spans substantially the entire distance between opposing side edges 13 and 14 of a tread plate, and includes a fastening receiver 34 adjacent each side edge. It is preferred that reinforcement means 33 comprises a tube 36, generally circular in cross-section, and having an open bottom 37. This structure is shown most clearly in the cross-sectional view contained in Figure 8.

It should be noted that a connector rib 38 is provided between male connecting edge and the tube 36. Connector rib 38 includes fillets, or radii, 39 to provide extra strength in the connection system interconnecting two tread plates. Fillets 39 also mirror the reinforcement provided by the fillets 28, included within the female connecting edge 17. Connector rib 38 also includes an outer planar portion 41 which is maintained in flush relation with an abutting portion of female connector head 22. Through this strategic reinforcement of the tread plate construction, particularly in the area of the means connecting adjacent plates, stresses imposed on individual tread plates are effectively transferred and distributed to adjacent plates.

Where reinforcement means 33 is generally tubular in configuration, fastening receiver 34 merely constitutes the open end of tube 36. However, other shapes or structures for the reinforcement means may require different fastening receivers. For example, if the reinforcement means were a solid bar or rod, the fastening receiver may be a tapped hole. If the reinforcement

means were a hollow tube, square in cross-section, a threaded insert piece may be employed. In any event, it is preferred that fastening receiver 34 be capable of receiving a detachable fastener, such as a threaded rail bolt 42. Since the preferred material for tread plate 12 is extruded aluminum, rail bolt 42 may be of the self-tapping variety, capable of forming its own threads within fastening receiver 34.

Walk ramp 11 further includes a first side rail 43 and a second side rail 44. The length of side rails 43 and 44 is generally co-extensive with the length of the assembled tread plates 12. First side rail 43 includes an inwardly facing channel 46, sized to accept the side edges 13 of the tread plates 12. Similarly, second side rail 44 includes an inwardly facing channel 47, sized to accept the side edges 14 of the tread plates 12.

The previously mentioned rail bolts 42, provide the primary means for securing the side edges of the tread plates within a respective channel. Rail bolts 42 are passed inwardly through an aperture 48 in the side rail, where they are threadably engaged with a respective fastening receiver 34. This process draws the side edges of the tread plates into tight, abutting relation with the base of the channel. In addition, rail bolts 42 act structurally to integrate the reinforcement means 33 of each tread plate, with the side rails 43 and 44.

Side rails 43 and 44 include specific structures to enhance their strength and rigidity. For example, upper reinforcement bar 49 and lower reinforcement bar 51 are provided on the side rails to resist vertical deflection of the rails. Channel fillets 52 are provided on both the upper and lower connection points between the channels and the side rails. These channel fillets 52 resist twisting forces imposed on the channels from downward vertical forces applied to the tread plates.

Walk ramp 11 also includes an apron 53 attached to the upper ends of each of the side rails 43 and 44. Apron 53 includes a transition plate 54 and lateral support arms 56. Apron 53 is

designed to provide a smooth transition between the upper end of the ramp and the surface of the truck bed or loading dock upon which the ramp is placed. For that purpose, transition plate 54 is oriented at an angle which is generally parallel to, or in some cases co-planar with, with the truck bed or loading dock surface. Support arms 56 are attached to the outer sidewalls of the side rails by means of bolts 57 and nuts 58.

The walk ramp 11 further includes a skid plate 59, attached to the lower end of each of the side rails 43 and 44. Skid plate 59 includes an angled facet 61 to provides a smooth transition with the ground or the loading dock, for rolling implements onto or off of the ramp. Lateral brackets 62, extend from the skid plate to slide over respective upper and lower portions of the channels 46 and 47. Channel bolts 63 and nuts 64 are employed to secure brackets 62 to the channels.

To reduce the overall weight of the walk ramp 11, a plurality of apertures 66 are provided in spaced relation within tread channels 31. Apertures 66 are preferably in the configuration of elongated slots, but any size and shape appropriate for the width of the tread channels is satisfactory, providing the structural integrity of the tread plates is not significantly reduced. In addition, the tread plates may including one or more gripping apertures 67 in various locations throughout the plate. Gripping apertures 67 are sized and configured to pass a human hand, and provide the ramp user with a positive means to lift the ramp for placement and removal.

It will be appreciated, therefore, that I have disclosed an improved walk ramp, employing a plurality of interlocking, modular tread plates, including various reinforcement features, in which the side ends of the tread plates interconnect with and a pair of opposing side rails, providing a rigid, lightweight, and durable structure.